INTERIM FIELD REPORT

ENNADAI LAKE PROJECT

DISTRICT OF KEEWATIN

Funded by the
CANADA - NWT MINERAL DEVELOPMENT AGREEMENT

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Introduction

The following is a field report that summarizes the results of ongoing mapping and economic evaluation of parts of the Ennadai Lake map sheet (GSC).

Field work commenced on June 7 in the Kiyuk Lake area. A second camp was established at Windy Lake on July 17. Although the outcrop is not good, it is adequate for 1:50,000 - scale mapping. The interpretations given should be considered provisional and subject to revision; further mapping (until September 6) will test present ideas and clarify ongoing problems.

Outlined below are the essential elements of the stratigraphy, sedimentology, structure and economic geology of the belt of Archean (?) and Proterozoic (Hurwitz and Ennadai Groups) rocks extending from Kiyuk to Windy Lakes. Of particular interest are the numerous gossans found during the course of mapping in Archean (?) mafic (in part silicified) metavolcanic rocks, and Proterozoic carbonates, quartz arenites, conglomerates, arkoses and diabase dykes.

Stratigraphy and Sedimentology

The stratigraphy and environmental interpretation of the units mapped is presented in Table 1. For the purpose of this report, the term "Ennadai Group" is used to refer to the unit of conglomerate and arkose that unconformably overlies the Hurwitz Group (after Eade and Chandler 1975). Historically ("Ennadai-Rankin Greenstone Belt") and more recently (MacDonald 1984, Chiarenzelli and MacDonald 1986) used the term "Ennadai" for the suite of Archean metavolcanics and metasedimentary rocks extending from northeastern Saskatchewan to Rankin Inlet. The confusion in stratigraphic nomenclature will be dealt with in future reports.

Eade (1971) considered that mafic metavolcanic rocks (Unit 1) in the Windy Lake area are equivalent to the belt of mainly metavolcanic rocks, from northeastern Saskatchewan to Rankin Inlet, that have been demonstrated to be Archean (Chiarenzelli and MacDonald 1986, Mortensen and Thorpe 1987). However, the possibility that the inlier at Windy Lake is Proterozoic cannot be precluded (possibly Happotiyik member, Ameto Fm).

The sub-Hurwirtz unconformity has not been documented. Slates and phyllites of the Ameto Formation are only locally exposed. We have assigned quartz arenites that conformably overlie mixed carbonates and siliciclastics of the Waterson Formation to the Tavani Formation on the basis of characteristic lithology. Eade (1971) considered these rocks as arkoses of the Ducker Formation of the un-named unit of arkoses in the Ennadai Group. The Ducker Formation, apparently well-developed in contact with the western outlier of Ennadai Group rocks southeast of Ennadai Lake, does not appear to be exposed in the Kiyuk-Windy Lakes area.

The age of the Hurwitz and Ennadai Groups remains problematic. We have found, and sampled for baddellyite dating, north-northwest trending diabase dykes that clearly cross-cut both the Hurwitz and Ennadai Groups (cf. Eade 1971). The dykes have undergone brittle faulting and do not have the northwest trend of the Mackenzie Swarm. We have not found the dykes in the Nueltin Granite and are assuming that the dykes pre-date the granite.

STRUCTURE

Repetition of stratigraphy in the Kiyuk Lakes area is a consequence of:

1. A major, gently northeast-plunging, northwest-vergent syncline along the long axis of the lake;

2. Two "in sequence" apparently northwest-vergent thrust faults and

3. Two "out of sequence" northwest-vergent thrust faults that breach (Butler, 1987) the base of the westernmost "in sequence" thrust.

A number of major north-northwest and north-northeast (strike-slip?) faults cut across the northeast and east structural grain. As discussed below, the large number of gossans in all units (except the Nueltin Granites) may be related to these late faults.

Ongoing work includes kinematic analysis to rigorously specify sense of fault transport, the preparation of balanced cross-sections to quantify the amount of shortening across the belt, mapping the continuation of the thrusts in the Windy Lake area and evaluating mineralization close to the late faults.

ECONOMIC GEOLOGY

A surprisingly large number of gossans have been found during mapping. Samples of these have been shipped to Ottawa for Au +33 analysis at Bondar-Clegg, the results of which should be available in September.

In general, the gossans consist of iron-copper sulphide and oxide disseminations. At one locality, galena was found in a carbonate host. In all cases the mineralization appears to be epigenetic, occurring as fracture-fills and irregular pods that cut across primary structures. In the Windy Lake area, most of the gossans are in close proximity to the late NNW and NNE-trending faults.

Two gossans are worth highlighting. The first is at a waterfall on Windy River (60 33'N /100 10'W). A NNE-trending diabase dyke is in brittle fault contact with Ennadai Group arkose. Both the arkose and the diabase are intensely fractured. A gossanous zone, up to 3 m wide, is developed along the 30 m

exposure of the fault, in the fault gouge, the arkose and the diabase. The gossanous material consists of iron and copper sulphide and oxide. Original mineralogy has not been positively identified.

The second gossan (originally mapped by Eade, 1971) is on northern Windy Lake (60 32'N /100 09'W). Here, metre-scale iron-copper/oxide-sulphide zones stain mafic volcanic rocks and silicified zones in these rocks. The number and size of outcrops in the area are not large; however each one is gossanous. Furthermore, the area, about 7 km , is one of boulder (several metres) till-ridge development. Virtually every boulder encountered is also gossanous. The mafic volcanic rocks are exposed in a wedge between a NNW and a NNE-trending fault; the mineralization may be related to fluid movement along these faults.

During the remainder of the field season, the full extent of the mafic volcanic unit will be mapped, gossans both in outcrop and in boulders will be sampled and mapping of the Nueltin Granite-Proterozoic contact will continue, looking for Au, U, W, Mo and Co mineralization (Charbonneau and Swettenham 1986) in skarns close to the contact, with the aid of a scintillometer. Dr. A. R. Miller (Mineral Resources Division, Geological Survey of Canada, Scientific Authority for the GSC component of the project) may visit to map and examine the showings in late August.

CONCLUSIONS

Archean (?) mafic volcanic rocks, locally silicified, contain gossans wherever these rocks are exposed, both in outcrop and in float. Proterozoic sedimentary rocks (locally gossanous) form a northwest-vergent fold-thrust belt in the Kiyuk-Windy Lakes area. The Hurwitz Group appears to record the development of a basinac (Ameto Fm) to shallow offshore-nearshore (Watterson Fm) to subareal (Tavani Fm) shoaling-upward megasequence. The Ennadai Group (as used in this report, following Eade and Chandler 1975, cf. MacDonald 1984) unconformably overlies the Hurwitz Group and records a fining-upward megasequence from alluvial fan conglomerates to fluvial arkoses. A locally developed breccia with arkose fragments may be a talus deposit formed due to late syn-sedimentary thrusting. Both the Hurwitz and Ennadai Groups have been cut by faulted NNE-trending diabase dykes (These have been sampled for baddellyite geochronology). All units are cut by the Nueltin Granite.

The numerous gossans found in all units (except the Nueltin Granite) have been sampled and shipped for Au (+33) analysis at Bondar Clegg. Mineralization appears to be related to late NNE and NNW trending (strike-slip?) faults.

Mapping will continue until September 6, and will test ideas presented herein and further evaluate the economic potential of the area.

TABLE 1
Stratigraphic and Environmental Interpretation
Kiyuk-Windy Lakes Area (65C)

Nueltin Granite (9)		granite, granodiorite quartz monzonite	
		intrusive	
NNE Diabase (8)		demonstrated to cut Hurwitz and Ennadai Groups; relationship to Nueltin Granites uncertain.	
		intrusive	
	(7)	sandstone breccia with botryoidal hematitic siliceous cement	talus; representing late thrusting
		intrabasinal unconformity	
Ennadai Group	(6)	arkose, parallel stratified and low angle cross-stratified; local wedge-planar cross-beds; rare pebbles, mudstone layers.	flash-flood fluvial
		conformable(?)	
	(5)	massive polymictic conglomerate, massive; local arkose interbeds	alluvial fans
		unconformity demonstrated	
Hurwitz Group	Tavani Fm (4)	quartz arenite with local interbeds of quartz pebble and cryptalgal laminate pebble conglomerate; rare cryptalgal laminate interbeds.	coastal eolian; partly beach; fluvial
		conformable/gradational	

Continued

	Watterson Fm (3)	interlayered cryptalgal laminates (locally oncolitic) and dcm-scale sandstone to siltstone in fining-upwards sequences	siliciclastic to intertidal carbonate shoaling-upwards cycles
Hurwitz Group		gradational/conformable	
	Ameto Fm (2)	slate, phyllite	"deep" basin
		unconformity (undocumented)	
Archean	(1)	mafic volcanics, locally silicified, with possible highly-strained pillow selveges	

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